

San Francisco Hep B Free: A Grassroots Community Coalition to Prevent Hepatitis B and Liver Cancer

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Abstract Chronic hepatitis B is the leading cause of liver cancer and the largest health disparity between Asian/Pacific Islanders (APIs) and the general US population. The Hep B Free model was launched to eliminate hepatitis B infection by increasing hepatitis B awareness, testing, vaccination, and treatment among APIs by building a broad, community-wide coalition. The San Francisco Hep B Free campaign is a diverse public/private collaboration unifying the API community, health care system, policy makers, businesses, and the general public in San Francisco, California. Mass-media and grassroots messaging

raised citywide awareness of hepatitis B and promoted use of the existing health care system for hepatitis B screening and follow-up. Coalition partners reported semi-annually on activities, resources utilized, and system changes instituted. From 2007 to 2009, over 150 organizations contributed approximately \$1,000,000 in resources to the San Francisco Hep B Free campaign. 40 educational events reached 1,100 healthcare providers, and 50% of primary care physicians pledged to screen APIs routinely for hepatitis B. Community events and fairs reached over 200,000 members of the general public. Of 3,315 API clients tested at stand-alone screening sites created by the campaign, 6.5% were found to be chronically infected and referred to follow-up care. A grassroots coalition that develops strong partnerships with diverse organizations can use existing resources to successfully increase public and healthcare provider awareness about hepatitis B among APIs, promote routine hepatitis B testing and vaccination as part of standard primary care, and ensure access to treatment for chronically infected individuals.

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Abbreviations

ALC	Asian Liver Center at Stanford University
Anti-HBs	Hepatitis B surface antibody
API	Asian and Pacific Islander
AWF	AsianWeek Foundation
CDC	Centers for Disease Control and Prevention
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
PSA	Public service announcement

SFDPH San Francisco Department of Public Health
 SFHBF San Francisco Hep B Free

Introduction

Chronic infection with hepatitis B virus (HBV) is one of the largest racial/ethnic health disparities in the United States. Approximately 10% of foreign-born Asians and Pacific Islanders (APIs) have chronic hepatitis B, compared with less than 0.5% of the general US population and less than 0.2% of non-Hispanic whites [1]. Without appropriate monitoring and treatment, one in four individuals with chronic hepatitis B will die from liver cancer or liver failure [2]. Many of these deaths are preventable through hepatitis B vaccination, which has been available since 1982, and anti-viral therapy, which reduces the risk of progression from chronic hepatitis B to liver cancer [3]. Liver cancer mortality may also be reduced through routine liver screening to enable early diagnosis and treatment [4].

To benefit from liver cancer preventive measures, one must first be diagnosed with chronic hepatitis B. Because the vast majority of chronically infected individuals have no symptoms, the only reliable method to diagnose chronic hepatitis B is with a serologic (i.e., blood-based) test for hepatitis B surface antigen (HBsAg). Likewise, the only way to ensure that an individual is protected against hepatitis B is with a serologic test for hepatitis B surface antibody (anti-HBs). The US Centers for Disease Control and Prevention (CDC) recommends routine hepatitis B testing for all individuals born in regions with an intermediate or high population seroprevalence of HBsAg—including all of Asia and the Pacific Islands—as well as US-born individuals not vaccinated in infancy whose parents were born in regions of high HBsAg seroprevalence [5]. Because two-thirds of APIs in the US are foreign-born [6], and more than three-quarters of US-born APIs have parents born in Asia or the Pacific Islands [7], virtually all APIs should be routinely tested for hepatitis B.

However, the CDC recommendations are not widely known or followed, and testing coverage among APIs is inadequate. For instance, 30% of primary care providers in San Francisco prior to 2007 could not correctly identify the screening test for hepatitis B, and most were unaware of the disproportionate burden of chronic infection among Chinese immigrants [8]. Among New Jersey family physicians, more than 70% did not routinely perform liver cancer screening among patients with chronic hepatitis B, and only 50% followed the CDC recommendation for hepatitis B testing in household contacts of persons with chronic infection [9]. Even among Asian American

primary care physicians, less than one third reported routinely testing their API patients for hepatitis B [10].

A similar lack of awareness about hepatitis B is also seen in the general public: up to two-thirds of chronically infected APIs are unaware of their infection status [11]. Community studies have consistently demonstrated low knowledge about hepatitis B risks, transmission, and prevention among APIs [11–23], and some studies showed that fewer than half of API adults had ever been tested or vaccinated, with especially low rates in socioeconomically disadvantaged populations [13, 16–18, 20, 24]. These findings demonstrate the need for broad-based strategies, including culturally tailored educational materials and media campaigns, to engage the API community in addressing hepatitis B.

To overcome existing barriers, the San Francisco Hep B Free campaign (SFHBF) was launched in 2007 to increase hepatitis B awareness, testing, vaccination, and treatment among APIs by forming a community coalition to educate health care providers and the general population, and to provide access to low-cost hepatitis prevention. In this report, we describe campaign activities and results through 2009, with the goal of demonstrating the success of Hep B Free and sharing methods used so that this program can be adapted by other communities.

Methods

Mission and Guiding Principles

The mission of SFHBF is to make San Francisco the first hepatitis-B-free city in the nation. The objectives of SFHBF are: (1) to create public and health care provider awareness about the importance of testing and vaccination to decrease the burden of hepatitis B in the API community; (2) to promote routine hepatitis B testing and vaccination, and make them the standard of care in the primary medical community; and (3) to ensure access to treatment for chronically infected individuals. To accomplish these objectives, the program uses culturally targeted strategies to increase hepatitis B testing, vaccination, and treatment services in the high-risk API community; and it promotes general knowledge about hepatitis B to create broad public awareness and institutional change toward ending hepatitis B infection.

SFHBF was designed as a grassroots, community-based health initiative with these guiding principles: (1) to maximize use of existing resources and community organizations, rather than to create a new standalone institution; (2) to be self-sustaining and integrated into the existing health care system; (3) to adopt practices that could be readily replicated elsewhere; (4) to pursue all available

funding opportunities, but not wait for funding before taking action; (5) to remain focused on the primary goal of hepatitis B control; (6) to reflect and take advantage of specific characteristics of the API community, and (7) to use a multi-faceted approach targeting the API community, the health care system, policy makers and public officials, and the general public. Many of these guiding principles follow the theoretical framework of Community Coalition Action Theory [25], which posits that through collaboration and synergy, community coalitions can bring about changes that the contributing members would be unable and, often, unwilling to accomplish individually [26].

San Francisco possesses unique characteristics that served as both an impetus and a challenge to the initiation of SFHBF. APIs comprise one-third of San Francisco's nearly 800,000 residents, and 67% of those APIs are foreign-born [6]. At the county level, San Francisco has the highest incidence rate of liver cancer in the nation [27]. Because 91% of API adults in San Francisco have health insurance [28], SFHBF could function within existing medical infrastructure by encouraging people to visit their regular health care provider for hepatitis B testing, vaccination, and follow-up.

Steering Committee Formation

In April 2007, SFHBF was launched after 6 months of strategic planning by the founding Steering Committee. This committee's makeup reflects the depth and breadth of experience among partners in the campaign, and includes a specialist in health promotion (from the San Francisco Department of Public Health [SFDPH]), an academic and clinical expert on hepatitis B and liver cancer (from the Asian Liver Center at Stanford University [ALC]), and an API community and media leader (from the AsianWeek Foundation [AWF]).

SFDPH has been involved in hepatitis B prevention and detection efforts since the 1990s. In 1997, SFDPH permanently allocated general funds to purchase adult hepatitis B vaccine for distribution to clinics and other community partners serving low-income, uninsured patients. SFDPH's commitment to SFHBF was critical for enlisting involvement of other health care players, adding legitimacy to interactions with community groups and the public, and contributing expertise in health promotion and education. SFDPH houses all data collected for SFHBF, and oversees campaign documentation and evaluation efforts.

ALC was established at Stanford University in 1996 as the first non-profit organization devoted to addressing chronic hepatitis B and liver cancer among APIs. ALC provides SFHBF with expertise in hepatitis B outreach, education, advocacy, and community-based research. In 2004, ALC partnered with SFDPH to launch "3 For Life,"

a 1-year pilot program that offered semi-monthly hepatitis B testing and vaccination for a discounted fee at a non-clinical community setting in San Francisco. The results of this project offered proof of the need for expanded hepatitis B testing and education for San Francisco APIs [29].

AWF was founded in 2004 to organize and develop the API community. AWF provides SFHBF with strategic and tactical expertise on mobilizing the community to action. AWF also provides media expertise in reaching the API and general markets, understanding of the nuanced cultural protocols of the API community, and using community networks to engage public officials. In 2006, AWF invited ALC to the Asian Heritage Street Celebration in San Francisco to conduct the largest ever one-day hepatitis B screening event, at which 536 adults were screened in 5 h. Over the next few months, AWF brought together the San Francisco Health Commission and California Assembly Speaker Pro Tempore Fiona Ma to share the vision for universal hepatitis B screening for API adults. These discussions led to the creation of the Hep B Free model.

Fiona Ma was a San Francisco Supervisor in 2006, when she authored a resolution unanimously approved by the Board of Supervisors "establishing the goal of universal hepatitis B screening and vaccination for Asian and Pacific Islander residents of San Francisco." Ms. Ma, who herself is chronically infected with hepatitis B, provided leadership and motivation for SFHBF by publicly discussing her own experience with hepatitis B. She has become a national spokesperson for hepatitis B awareness, prevention, and detection efforts, and provides SFHBF with guidance on policy making and assistance with motivating high-level decision makers in public and private organizations to take more active roles as SFHBF partners.

Before officially launching SFHBF, the Steering Committee established certain minimum infrastructure requirements, including the campaign's name, mission, project description, website, and logo, and conducted basic research on the size, demographic characteristics, and health insurance coverage of the at-risk population.

Formation of Partnerships

The Steering Committee first conducted preliminary meetings and conversations with health care, industry, and community groups to assess interest in and feedback on a community-wide hepatitis B control effort. This process identified key issues, needs, and messages to ensure buy-in from key stakeholders and constituencies. In addition, the Steering Committee sought strong advocacy by garnering the support of high-profile leaders including Ms. Ma and San Francisco Mayor Gavin Newsom.

Obtaining commitments from all public and private county hospitals was critical to the campaign's success.

Hospitals and clinics were initially approached individually, after which the Steering Committee presented collectively to hospital chief executive officers at the San Francisco Hospital Council, a regional trade association. Each hospital took on a different role in SFHBF, with no single hospital designated as leader. By mid-2007, all San Francisco hospitals had pledged to prioritize elimination of hepatitis B. SFDPH committed to providing follow-up care to uninsured patients with chronic hepatitis B, and Hospital Council members pledged back-up support. In addition, health care institutions coordinated to create public hepatitis B testing and vaccination sites in the community, arrange continuing medical education courses, network with corporate sponsors, and perform research on hepatitis-B-related health care.

Non-health-care community partners, including virtually every local API community group, were recruited or volunteered to join the campaign by incorporating hepatitis B prevention into their own program as appropriate with their existing mission and resources. This integration encouraged increased participation and ownership by each partner organization, while the absence of minimum “membership” requirements enabled partners to contribute at whatever level was practical. For example, local merchants distributed SFHBF branded shopping bags, while two local colleges instituted campus-wide education, screening, and vaccination programs for all students, staff, and faculty. Community partners helped to disseminate campaign messages in culturally effective ways and ensure that the activities and policies of the campaign reflected community needs and cultural practices.

A core group of approximately 40 organizations have been considered as active partners that participate in monthly working meetings to plan strategies, implement activities, share resources and best practices, report on progress, and request assistance when necessary (Table 1). Specific tasks are accomplished by separate working groups with designated point persons. Active partners complete a survey every 6 months to detail their involvement via activities, expenses incurred, and services provided. The remaining community partners participate by attending and supporting SFHBF events and disseminating educational information via their own networks.

Funding

SFHBF was conceptualized and launched with no formal funding source. Each participating organization finds its own funding for its own programs. SFHBF uses a neutral fiscal agent to manage funds, and raises funds only for public awareness and education efforts, community outreach, and program evaluation. The campaign secured

Table 1 Actively participating partner organizations of the San Francisco Hep B Free Campaign, 2007–2010

Alison Public Relations
American Legion Cathay Post 384
American Liver Foundation
Asian Health Foundation
Asian Liver Center at Stanford University
Asian & Pacific Islander Health Parity Coalition
Asian Pacific Islander Wellness Center
AsianWeek Foundation
Brown & Toland Physicians Group
California Pacific Medical Center
Catholic Healthcare West
Chinatown Public Health Center
Chinese American Physicians Association
Chinese Community Healthcare Association
Chinese Hospital
City College of San Francisco
DAE advertising
Excelsior Health Services
Glide Health Services
interTrend Communications, Inc
Kaiser Permanente San Francisco
Laotian American National Alliance
Miss Asian American Pageant
NICOS Chinese Coalition
Niwa Public Relations
North East Medical Services
Office of Mayor Gavin Newsom
Office of California Assemblywoman Fiona Ma
Saint Francis Memorial Hospital
San Francisco Board of Supervisors
San Francisco Community Clinic Consortium
San Francisco Department of Public Health
San Francisco General Hospital Liver Center
San Francisco Giants
San Francisco Hep B Collaborative at Berkeley
San Francisco Hospital Council
San Francisco Medical Society
San Francisco State University
South of Market Health Center
St. Luke’s Hospital
St. Mary’s Medical Center
St. Anthony’s Free Medical Clinic
Subaru of America
Sunset Health Services
Sutter Health
University of California, San Francisco Liver Center
University of California, San Francisco Hepatitis B Collaborative
University of California, San Francisco Vietnamese Community Health Promotion Project
Walgreens
Active partners participated in monthly meetings and working groups

nearly \$2.5 million through 2009 in direct and in-kind donations from partners, government agencies, corporations, and private donors, as well as approximately 8,000 volunteer hours. Sources of funds include community fundraising events, corporate sponsorships, and grants from foundations, corporations, and the federal government.

Promotion of Education and Awareness

To incorporate routine hepatitis B testing of all API patients into standard health care, education of health care providers is essential. SFHBF began educating providers through ongoing grand rounds and continuing medical education events throughout the city. In addition, a physician working group collaboratively developed a quick-reference hepatitis B diagnostic flowchart for testing, test interpretation, and clarification of common misconceptions about hepatitis B and liver cancer. To further engage physicians, all health care providers in the city were asked to sign a pledge form stating that they would follow the CDC recommendations to test every API patient for hepatitis B. Physicians were contacted by sending fax messages from SFDPH, making telephone calls to physicians' offices, recruiting physician champions from each health care institution, and networking through medical groups and independent practice associations.

General community awareness about hepatitis B was promoted through grassroots community organizing, outdoor advertising on billboards, taxi tops, train stations, and bus panels and shelters, and advertising and news coverage in major mass-media covering the general and Asian print, radio, television, and internet markets (Fig. 1). Advertising campaigns were designed *pro bono* by leading Asian American advertising agencies. Media placements were funded through in-kind donations and cash in an approximately 4:1 ratio. Educational materials, including brochures,

posters, and public service announcements, were translated into Cantonese and Mandarin Chinese, English, Korean, Tagalog, and Vietnamese by local API media and medical students and undergraduates with background knowledge of hepatitis B. SFHBF's community involvement also provided unique access to public officials. SFHBF leaders worked with community advocacy groups, policymakers, and lobbyists to promote opportunities for legislative or regulatory changes regarding hepatitis B prevention, management, and research.

Serological Testing, Vaccination, and Referrals

A key component of SFHBF is provision of testing, vaccination, and follow-up for hepatitis B through existing health care providers. Hospital and clinic-affiliated testing and vaccination sites were funded, staffed, and managed by their independent institutions. Seven standalone public sites providing free hepatitis B testing and low-cost vaccination were established throughout the city beginning in 2007. These sites supplemented rather than replaced private providers or clinics, by making services more convenient for those with existing primary care, and to fill an unmet need for those without health insurance. Sites were manned by bilingual hospital/clinic staff and trained volunteers. Each site was separately managed according to its host institution's infrastructure.

At the outset, clinical partners convened to agree on overall goals and strategies, establish minimum standardized testing and vaccination protocols, and define the basic data points on participant registration forms. Each partner site informed clients about their serological test results and recommended follow-up steps using a variety of methods. Clients found to be protected against hepatitis B were sent letters, while susceptible clients (who were advised to be immunized against hepatitis B) or chronically infected

Fig. 1 Examples of San Francisco Hep B Free advertising campaign materials. **a** Bus side advertisement with San Francisco Mayor Gavin Newsom and California State Assemblywoman Fiona Ma. **b** “B a Hero” Bay Area Rapid Transit poster. **c** “B a Hero” promotional vehicle donated by Subaru of America. **d** “Which One Deserves to Die?” campaign poster featuring beauty pageant contestants



clients (who were advised to seek follow-up medical care) were contacted via a combination of letters, phone calls, e-mail, and in-person appointments.

Data Collection and Analysis

At each testing/vaccination site, clients completed a standardized registration form providing basic demographic and health-related information. By request, hospital laboratories and independent diagnostic laboratories serving San Francisco provided data on the total number of HBsAg and anti-HBs tests ordered annually. Results from partner surveys and patient registration forms were analyzed using SAS version 9.1.3 (Cary, NC). We used logistic regression analysis to estimate unadjusted or multivariate adjusted odds ratios for associations with HBsAg positivity or anti-HBs negativity. All tests of significance were two-sided, and p -values ≤ 0.05 were considered statistically significant.

Results

Community Partnerships

SFHBF officially commenced in April 2007 with a community dinner with nearly 500 attendees representing over 150 community groups that pledged support for the campaign. Invited groups included hospitals, health care organizations, community-based organizations, academic institutions, student groups, professional societies, social service agencies, government agencies, media and advertising companies, and corporations. Additional partners asked to join the campaign or were recruited over time. As of 2010, more than 160 groups are partners in SF HepB Free, including more than 40 active partners (listed at <http://sfhepbfree.org/aboutus/> and in Table 1).

Among the 24 major partner organizations that completed a survey at the end of 2009, 13 (57%) were from the health care sector, 4 (17%) were academic institutions, 3 (13%) were community organizations, 3 (13%) were media organizations, and 1 was a government representative. Ten partners continuously offered free HBsAg screening and referrals to follow-up care for chronically infected patients; 9 conducted additional one-time community screening clinics at cultural festivals and other events; 6 provided continual free or low-cost hepatitis B vaccination; 10 participated in fundraising; 7 were involved in public outreach and marketing; and 5 conducted educational events for health care providers.

These 24 partner organizations raised \$1,274,000, including 85% from grant funding, to support SFHBF activities, and spent approximately \$2,752,000 on the campaign, including \$1,270,000 (46%) for paid staff, \$670,000 (24%) for marketing, \$272,300 (10%) for

supporting volunteers (who contributed 8,000 h), \$124,000 (5%) for laboratory costs, \$64,000 (2%) for vaccinations, and \$340,000 on other expenses such as travel and venue rental fees.

Education and Awareness Programs

Between 2007 and 2009, more than 40 educational events on hepatitis B were held, reaching over 1,100 health care providers in the city. In addition, laminated hepatitis B diagnostic flowcharts were distributed by SFDPH to all primary care physicians as a resource for hepatitis B testing. Among primary care physicians asked to sign a statement pledging to test all APIs for hepatitis B, 60% did so and were listed by name in a “Clinical Honor Roll” published regularly in local general and ethnic print media.

SFHBF partners published 280 billboards and bus panels, 488 newspaper public service announcements (PSAs), 62 television PSAs, 1,240 radio PSAs, 72 newsletters, 63 website banners and advertisements, and e-mail messages that reached an estimated 260,000 readers. In addition, campaign partners hosted informational booths, gave presentations, and distributed flyers and souvenirs at more than 120 community events, including street fairs, cultural shows, fashion shows, conference presentations, and classroom seminars; total attendance was approximately 200,000 people. Because community demonstrations and rallies are less culturally favored activities for the API community, SFHBF organized community banquets as a more culturally appropriate, intergenerational forum for increasing hepatitis B awareness.

Client Survey Results

At the seven public standalone SFHBF testing and vaccination sites, most clients were between ages 18 and 50 years, and 61% were female. Eighty percent were of API background, including 55% Chinese, and just over half spoke primarily in an Asian language only (Table 2). More than two-thirds of clients at the standalone sites were foreign-born, and 60% of those born in North America had at least one foreign-born parent. Only 18% reported ever having received immunization shots for hepatitis B, and 4% reported having previously been diagnosed with hepatitis B. The majority (59%) of clients had current health insurance, although fewer than half (46%) reported having a current medical provider.

Serologic Testing Results

At the seven standalone SFHBF testing and vaccination sites, 4,427 clients were serologically tested for HBsAg and anti-HBs, including 3,315 clients of API background.

Table 2 Demographic and health-related characteristics of clients tested for hepatitis B at standalone San Francisco Hep B Free sites

Characteristic	Total (N = 4,427)		Hepatitis B infection status		P-value
			Immune (anti-HBs+, HBsAg-) (N = 2,227)	Susceptible (anti-HBs-, HBsAg-) (N = 1,962)	Infected (HBsAg+) (N = 238)
Age (years)					
<18	22	0%	15	7	0
18–30	1,496	34%	964	474	58
31–40	585	13%	259	290	36
41–50	642	15%	244	350	48
51–60	941	21%	418	461	62
61+	731	17%	325	373	33
Median (range)	42 (9–108)		36 (11–108)	47 (9–11)	45 (18–84)
Sex					
Female	2,690	61%	1,408	1,169	113
Male	1,713	39%	806	782	125
Race/ethnicity					
Asian/Pacific Islander	3,467	80%	1,801	1,442	224
Chinese	2,388	55%	1,229	987	172
Filipino	402	9%	215	174	13
Vietnamese	239	5%	138	76	25
Korean	131	3%	83	43	5
Japanese	130	3%	42	88	0
Other Asian	152	3%	82	61	9
Pacific Islander	25	1%	12	13	0
Caucasian	408	9%	178	226	4
Hispanic/Latino	265	6%	121	144	0
Black/African American	71	2%	30	38	3
American Indian/Alaska Native	31	1%	13	16	2
Other/Multiracial	78	2%	36	40	2
Unknown	26	1%	14	12	0
Region of birth					
East Asia	1,877	43%	976	754	147
North America	1,405	32%	701	689	15
Southeast Asia/Pacific Islands	843	19%	424	356	63
Central Asia/South Asia/Middle East	65	1%	30	29	6
Central America/Caribbean/South America	99	2%	29	70	0

Table 2 continued

Characteristic	Total (N = 4,427)	Hepatitis B infection status			P-value
		Immune (anti-HBs+, HBsAg–) (N = 2,227)	Susceptible (anti-HBs–, HBsAg–) (N = 1,962)	Infected (HBsAg+) (N = 238)	
Europe	43	1%	23	0	0%
Africa	25	1%	11	3	1%
Mother's region of birth					<0.0001
East Asia	1,965	57%	819	139	71%
North America	434	13%	244	1	1%
Southeast Asia/Pacific Islands	825	24%	332	50	25%
Central Asia/South Asia/Middle East	57	2%	25	5	3%
Central America/Caribbean/South America	99	3%	63	0	0%
Europe	38	1%	23	0	0%
Africa	23	1%	8	2	1%
Father's region of birth					<0.0001
East Asia	2,010	59%	852	145	74%
North America	425	12%	225	2	1%
Southeast Asia/Pacific Islands	762	22%	303	43	22%
Central Asia/South Asia/Middle East	66	2%	28	5	3%
Central America/Caribbean/South America	91	3%	57	0	0%
Europe	41	1%	23	0	0%
Africa	21	1%	10	2	1%
Number of years in United States (excluding those born in North America)					<0.0001
0–5	618	25%	226	56	31%
6–10	390	16%	159	35	19%
11–20	643	26%	268	43	23%
21+	804	33%	386	49	27%
Median (range)	14 (0–71)	13 (0–65)	16 (0–71)	11 (0–57)	0.0002
Primary language					<0.0001
Asian language only	2,194	52%	851	187	80%
English only	950	22%	498	10	4%
Spanish only	80	2%	52	0	0%
Other language only	64	2%	28	6	3%
Asian + English/other language	884	21%	407	29	12%
English + Spanish/other language	69	2%	25	2	1%

Table 2 continued

Characteristic	Total (N = 4,427)	Hepatitis B infection status			P-value			
		Immune (anti-HBs+, HBsAg−) (N = 2,227)	Susceptible (anti-HBs−, HBsAg−) (N = 1,962)	Infected (HBsAg+) (N = 238)				
Ever received shots for hepatitis A								
No	1,551	43%	667	37%	766	48%	118	58%
Yes	388	11%	232	13%	139	9%	17	8%
Not sure	1,671	46%	919	51%	685	43%	67	33%
Ever received shots for hepatitis B						<0.0001		
No	1,484	41%	588	32%	775	48%	121	60%
Yes	655	18%	450	24%	189	12%	16	8%
Not sure	1,509	41%	804	44%	641	40%	64	32%
Ever diagnosed with hepatitis B by a doctor						<0.0001		
No	2,031	80%	1,010	81%	955	84%	66	45%
Yes	99	4%	34	3%	13	1%	52	35%
Not sure	397	16%	196	16%	172	15%	29	20%
Family history of hepatitis B						<0.0001		
No	2,340	64%	1,141	62%	1,097	68%	102	51%
Yes	283	8%	149	8%	98	6%	36	18%
Not sure	1,021	28%	545	30%	414	26%	62	31%
Current health insurance						<0.0001		
No	1,343	37%	667	37%	569	36%	107	52%
Yes	2,116	59%	1,061	59%	962	61%	93	45%
Not Sure	139	4%	76	4%	57	4%	6	3%
Current medical provider						0.0002		
No	1,425	47%	781	49%	558	44%	86	65%
Yes	1,393	46%	694	44%	659	52%	40	30%
Not sure	185	6%	117	7%	62	5%	6	5%

Among the APIs, 6.5% ($N = 224$) were chronically infected, 41.6% ($N = 1,381$) were susceptible, and 51.9% ($N = 1,719$) were immune (Table 2). When the serological results were further restricted to the 2,639 API clients born in Asia, 7.9% ($N = 208$) were chronically infected.

Of note, among clients who provided information on whether or not they had already been diagnosed with hepatitis B by a doctor, 66 of 147 (44.9%) chronically infected individuals reported that they had not previously been diagnosed, and 29 of 147 (19.7%) were unsure whether they had been diagnosed. Thus, up to two-thirds of clients with chronic hepatitis B were previously unaware of their infection. In addition, 16 of 655 clients (2.4%) who reported having received immunization shots for hepatitis B were in fact chronically infected.

After mutual adjustment, we found that being between ages 41 and 60 years, male, of API background, born outside North America, and without a current medical provider were statistically significantly associated with a higher risk of being chronically infected with hepatitis B (Table 3). In addition, individuals who had not received hepatitis B immunization shots, had previously been diagnosed with hepatitis B by a doctor, or had a family history of hepatitis B were at significantly elevated risk of chronic infection. Factors associated with a higher risk of being unprotected against hepatitis B were older age, birth outside Asia and the Pacific Islands, and a non-Asian primary spoken language (Table 3). Results were essentially unchanged when the analysis was restricted to API clients (data not shown).

Laboratory Results

At all hospital and independent diagnostic laboratories serving San Francisco, 69,821 tests for HBsAg and 54,340 tests for anti-HBs were ordered in 2006, the year before SFHBF was launched. In 2007, 72,678 tests for HBsAg (a 4% increase over 2006) and 56,001 tests for anti-HBs (a 3% increase over 2006) were ordered. In 2008, 75,122 tests for HBsAg (an 8% increase over 2006) and 63,462 tests for anti-HBs (a 17% increase over 2006) were ordered.

Follow-Up Results

Based on reports from the seven standalone SFHBF testing and vaccination sites, 69% of clients found to be chronically infected were enrolled in follow-up clinical care. Of nearly 2,000 clients found to be susceptible, 52% received at least the first shot of hepatitis B vaccine, and 49% of these completed the three-shot vaccine series at one of the standalone sites.

Discussion

Our results show that SFHBF successfully established a dedicated community network to increase hepatitis B knowledge, testing, vaccination, and follow-up in San Francisco. Critical to success was inclusion of a diverse array of partners, including all hospitals, other health care and public health entities, and dozens of partners with expertise in non-health-related areas, including both API and non-API organizations. We believe that several strategies were integral to the promotion of effective collaboration among these partners: (1) delineating and sharing collective goals and protocols, (2) distributing leadership responsibilities, (3) finding appropriate roles that matched partners' skills and expertise, (4) encouraging partners' ownership of key issues and actions, (5) recognizing each partner's contributions, and (6) continuously reaching out to find new, complementary partners. These aspects of SFHBF correspond to coalition-building factors that have been found to be consistently effective, namely, formalization of procedures, strong leadership, active membership participation, membership diversity, collaboration among member agencies, and group cohesion [30].

Community coalitions such as SFHBF can be evaluated at three levels: the level of infrastructure, function, and processes; the level of programs and interventions; and the level of community changes [26]. The first level, internal coalition functioning, can be assessed in terms of the size of the coalition membership, the number of people reached by coalition efforts, the number of actions implemented, and member satisfaction with coalition functioning, all of which aim to evaluate the process of community building [26, 30, 31]. Evidence of the successful infrastructure and functioning of SFHBF comes from its engagement of more than 160 community partners, more than 40 of which voluntarily meet on a monthly basis; and its completion of more than 40 physician education events and 120 community events, which reached over 1,100 health care providers and 200,000 community members, respectively, in only 2 years. High levels of participation in monthly partner meetings may be attributable in part to thoughtful planning and scheduling, as well as promoting a collegial atmosphere with active solicitation of input, offering of constructive feedback and recognition of contributions, and transparent sharing of information and resources.

The second level of evaluation, implementation of coalition programs and activities, can be evaluated based on the extent to which specific program objectives are met, using data from such sources as hospital or clinic records and patient surveys [26]. Results from all laboratories serving San Francisco indicate a steady increase in hepatitis B testing from 2006 through 2008, suggesting considerable progress toward our objectives of increasing

Table 3 Associations of demographic and health-related characteristics with hepatitis B infection status among clients tested at standalone San Francisco Hep B Free sites

Characteristic	Infected vs. immune						Susceptible vs. immune					
	Unadjusted			Adjusted			Unadjusted			Adjusted		
	OR	95% CI	P-value	OR*	95% CI*	P-value	OR	95% CI	P-value	OR [†]	95% CI [†]	P-value
Age (years)												
<30	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
31–40	2.3	(1.5, 3.6)		1.4	(0.9, 2.2)		2.3	(1.9, 2.8)		2.8	(2.3, 3.5)	
41–50	3.3	(2.2, 5.0)		1.8	(1.2, 2.8)		2.9	(2.4, 3.6)		3.8	(3.1, 4.7)	
51–60	2.5	(1.7, 3.6)		1.5	(1.0, 2.3)		2.2	(1.9, 2.7)		3.0	(2.5, 3.6)	
61+	1.7	(1.1, 2.7)	<0.0001	1.1	(0.7, 1.8)	0.06	2.3	(1.9, 2.8)	<0.0001	3.3	(2.7, 4.1)	<0.0001
Sex												
Female	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
Male	1.9	(1.5, 2.5)	<0.0001	1.8	(1.3, 2.3)	<0.0001	1.2	(1.0, 1.3)	0.02	1.1	(1.0, 1.2)	0.18
Race/ethnicity												
Chinese	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
Filipino	0.4	(0.2, 0.8)		0.6	(0.3, 1.2)		1.0	(0.8, 1.3)		1.0	(0.7, 1.4)	
Vietnamese	1.3	(0.8, 2.0)		1.4	(0.7, 2.5)		0.7	(0.5, 0.9)		0.8	(0.6, 1.1)	
Other Asian/Pacific Islander	0.8	(0.4, 1.6)		0.8	(0.4, 1.9)		0.9	(0.7, 1.3)		1.0	(0.6, 1.5)	
Non-Asian/Pacific Islander	0.2	(0.1, 0.4)	<0.0001	0.4	(0.2, 0.9)	0.007	1.5	(1.3, 1.8)	<0.0001	1.2	(0.8, 1.6)	0.08
Region of birth												
East Asia	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
North America	0.1	(0.08, 0.2)		0.3	(0.1, 0.5)		1.3	(1.1, 1.5)		1.3	(1.0, 1.6)	
SE Asia/Pacific Islands	1.0	(0.7, 1.4)		1.1	(0.7, 1.7)		1.1	(0.9, 1.3)		1.0	(0.8, 1.2)	
Other	0.7	(0.3, 1.3)	<0.0001	1.5	(0.6, 3.9)	0.0001	1.9	(1.4, 2.5)	<0.0001	1.7	(1.2, 2.5)	0.01
Mother's region of birth												
East Asia	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
North America	0.04	(0.01, 0.3)		0.3	(0.03, 2.2)		1.6	(1.3, 2.0)		1.2	(0.9, 1.6)	
SE Asia/Pacific Islands	0.8	(0.6, 1.2)		1.1	(0.6, 2.0)		0.9	(0.8, 1.1)		0.9	(0.7, 1.2)	
Other	0.6	(0.3, 1.2)	0.0009	1.5	(0.4, 5.4)	0.36	1.6	(1.2, 2.1)	<0.0001	1.0	(0.7, 1.6)	0.54
Father's region of birth												
East Asia	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
North America	0.1	(0.02, 0.3)		0.5	(0.1, 2.2)		1.4	(1.1, 1.7)		0.9	(0.7, 1.2)	
SE Asia/Pacific Islands	0.7	(0.5, 1.0)		0.9	(0.5, 1.5)		0.9	(0.7, 1.0)		0.8	(0.6, 1.1)	
Other	0.5	(0.2, 1.1)	<0.0001	1.5	(0.4, 5.4)	0.42	1.5	(1.1, 2.0)	0.0003	0.9	(0.6, 1.4)	0.62
Number of years in United States												
0–5	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
6–10	1.1	(0.7, 1.7)		1.0	(0.6, 1.6)		1.2	(0.9, 1.6)		1.1	(0.8, 1.4)	
11–20	0.8	(0.5, 1.2)		0.8	(0.5, 1.2)		1.2	(1.0, 1.5)		1.0	(0.8, 1.2)	
21+	0.8	(0.5, 1.2)		0.7	(0.5, 1.1)	0.36	1.6	(1.2, 1.9)		1.0	(0.8, 1.3)	0.98
(Born in North America)	0.1	(0.07, 0.2)	<0.0001	(Not estimated)			1.5	(1.2, 1.8)	0.0004	(Not estimated)		
Primary language												
Asian language only	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
English only	0.1	(0.1, 0.3)		0.5	(0.2, 1.2)		1.5	(1.3, 1.8)		1.7	(1.4, 2.2)	
Asian + English/other language	0.4	(0.3, 0.6)		0.7	(0.4, 1.0)		1.2	(1.1, 1.4)		1.6	(1.3, 1.9)	
Other/Multiple	0.5	(0.2, 1.0)	<0.0001	1.2	(0.3, 4.3)	0.17	1.4	(1.1, 1.9)	<0.0001	1.5	(1.0, 2.2)	<0.0001

Table 3 continued

Characteristic	Infected vs. immune						Susceptible vs. immune					
	Unadjusted			Adjusted			Unadjusted			Adjusted		
	OR	95% CI	P-value	OR*	95% CI*	P-value	OR	95% CI	P-value	OR [†]	95% CI [†]	P-value
Ever received shots for hepatitis A												
No	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
Yes	0.4	(0.2, 0.7)		0.7	(0.4, 1.2)		0.5	(0.4, 0.7)		0.5	(0.4, 0.7)	
Not sure	0.4	(0.3, 0.6)	<0.0001	0.6	(0.4, 0.8)	0.002	0.6	(0.6, 0.7)	<0.0001	0.7	(0.6, 0.9)	<0.0001
Ever received shots for hepatitis B												
No	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
Yes	0.2	(0.1, 0.3)		0.2	(0.1, 0.4)		0.3	(0.3, 0.4)		0.3	(0.3, 0.4)	
Not sure	0.4	(0.3, 0.5)	<0.0001	0.5	(0.4, 0.7)	<0.0001	0.6	(0.5, 0.7)	<0.0001	0.7	(0.6, 0.8)	<0.0001
Ever diagnosed with hepatitis B by a doctor												
No	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
Yes	23.4	(14.2, 38.5)		19.7	(11.5, 33.7)		0.4	(0.2, 0.8)		0.4	(0.2, 0.8)	
Not sure	2.3	(1.4, 3.6)	<0.0001	2.0	(1.3, 3.3)	<0.0001	0.9	(0.7, 1.2)	0.02	1.0	(0.8, 1.3)	0.06
Family history of hepatitis B												
No	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
Yes	2.7	(1.8, 4.1)		2.5	(1.6, 3.9)		0.7	(0.5, 0.9)		0.8	(0.6, 1.0)	
Not sure	1.3	(0.9, 1.8)	<0.0001	1.3	(0.9, 1.9)	0.0002	0.8	(0.7, 0.9)	0.002	0.9	(0.8, 1.1)	0.13
Current health insurance												
No	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
Yes	0.5	(0.4, 0.7)		0.9	(0.6, 1.3)		1.1	(0.9, 1.2)		0.9	(0.8, 1.1)	
Not sure	0.5	(0.2, 1.2)	<0.0001	1.0	(0.4, 2.6)	0.008 [‡]	0.9	(0.6, 1.3)	0.66	0.9	(0.6, 1.4)	0.79
Current medical provider												
No	1.0	Reference		1.0	Reference		1.0	Reference		1.0	Reference	
Yes	0.5	(0.4, 0.8)		0.6	(0.4, 0.9)		1.3	(1.1, 1.5)		1.0	(0.8, 1.2)	
Not sure	0.5	(0.2, 1.1)	<0.0001	0.7	(0.3, 1.6)	<0.0001	0.7	(0.5, 1.0)	<0.0001	0.8	(0.5, 1.1)	<0.0001 [‡]

OR odds ratio, CI confidence interval

* Adjusted for age, sex, race/ethnicity, region of birth, and current medical provider status

† Adjusted for age, region of birth, and primary language

‡ Having missing information was statistically significantly associated with the outcome (data not shown)

public and health care awareness and incorporating serological testing for hepatitis B into standard primary medical care. Because SFHBF was designed to encourage individuals to seek hepatitis B testing and follow-up through their own health care providers, we anticipate that the largest impact of SFHBF on hepatitis B preventive activity was seen in hospitals and doctors' offices. However, we could not collect patient data from these sources. From the seven standalone testing and vaccination sites, which represent a small subset of individuals who undertook hepatitis B preventive activity as a result of SFHBF, we collected data on 4,427 clients who were tested for hepatitis B during the first 2 years of the campaign. In accordance with the campaign's goals and strategies, these individuals were mostly of API background, but encompassed a wide range of ages, ethnicities, languages, and immigration histories,

and included the insured and uninsured, thus meeting our objective of ensuring access to testing, vaccination, and treatment for all individuals.

Data from the seven standalone sites were consistent with previous hepatitis B screening studies in API communities [11, 23, 32] and confirmed common misunderstandings regarding chronic hepatitis B infection and vaccination. We used these findings to improve our educational materials and programs for the general public and for health care providers. However, we lacked information on changes in hepatitis-B-related knowledge as a result of these educational materials and programs, and were therefore unable to evaluate the success of these approaches. Nevertheless, previous studies using highly similar educational materials and programs resulted in significant increases in knowledge about hepatitis B among health care providers [33] and the general

population [19, 34]. Therefore, we expect that our educational efforts were successful in achieving our objective of increasing provider and public awareness about the importance of hepatitis B testing and vaccination to reduce the burden of this disease among APIs. We are now in the process of evaluating this aspect of the campaign.

The third level of coalition evaluation, community impact, can be measured by the coalition's influence on progressive changes in local agencies, programs, services, or policies, as well as increases in the community's capacity to solve collective problems [26, 30]. One of SFHBF's first accomplishments was to enlist every hospital in San Francisco to join the campaign by prioritizing the elimination of hepatitis B and contributing to the goals of the campaign. For many hospitals, this commitment represented a new advance in services and policies, and provided immediate evidence of the community impact of SFHBF. For the overall community, the campaign demonstrates the capacity of San Francisco's hospitals, community-based organizations, academic institutions, service agencies, government agencies, and businesses to come together and collaborate on solving the shared problem of hepatitis B. Even more noteworthy is the exceptional galvanization of the API community around a relevant health issue, a response that has not previously been seen on this scale. Further evidence of the public impact of SFHBF comes from recent national news coverage of SFHBF and hepatitis B prevention [35–37], as well as the replication of SFHBF in five other California counties and Chicago, Las Vegas, Hawaii, Philadelphia, and Washington, DC.

Initial limitations of SFHBF became strengths over time. For example, the lack of set-aside funding created early challenges and a dependence on volunteerism and self-motivation by partners. However, this lack of funding can now be considered an advantage, forcing the use of existing resources to establish a stable, sustainable program that does not rely on time-limited grants or sponsorships, and is not a new institution requiring separate ongoing support. Likewise, the decentralized structure of SFHBF and its reliance on partner involvement may have slowed and complicated some decision-making and assignment of responsibilities, but these features have also allowed partners to be autonomous and self-motivated, fostered integration of the campaign's mission and objectives with those of its partners, and ultimately resulted in solid, long-term commitment by the partners.

Another limitation of SFHBF is the shortage of data for evaluation of its impact. Evaluation of community coalitions, including SFHBF, is often challenging because the vast majority of energy and funding is spent on planning and implementing interventions [26]. As a result, evaluation strategies are not built into the planning process and are not adequately funded.

In summary, SFHBF is a grassroots community coalition that used existing resources and strong partnerships with diverse community organizations to successfully increase public and health care provider awareness about hepatitis B among APIs, promote routine hepatitis B testing and vaccination as part of standard primary care, and ensure access to treatment for chronically infected individuals. The absence of dedicated funding and a single designated leader makes it feasible to replicate this program in other communities with a high burden of chronic hepatitis B. The prominent health disparity due to hepatitis B and its often fatal consequences, the availability of simple steps to detect, prevent, and manage the disease, and the current deficiency of hepatitis B awareness and preventive activity among health care providers and the general public combine to present an unsailable case for making elimination of hepatitis B a top public health priority. The universal appeal and logic of this message are what united more than 160 partners of SFHBF, and will bring together similar community coalitions to address hepatitis B in communities around the country.

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